

REMARKS

Applicants amend claims 1, 2, and 12, and introduce new claim 22, drawn to the subject matter covered by original claim 3. These amendments are supported by the claims as originally filed. Applicants respectfully submit that the claims as originally filed are both novel and unobvious in view of the prior art of record, and request that these be passed to issue.

Amendment has also been made to the specification paragraphs raising the examiner's objections.

REJECTION UNDER 35 USC §112, ¶1

A number of the present claims have been rejected by the examiner under 35 USC §112, ¶1 for lack of adequate enablement. Applicants respond by stating that whether or not a particular member of a cited group possesses the physical characteristics necessary to meet the limitations of a particular claim does not negate the limitation actually expressed in the claim. Therefore, for example, whether sorbic acid is liquid or solid at a given temperature is of no consequence to enablement of a claim requiring addition of a liquid carboxylic acid. One of skill in the art may certainly be presumed to recognize those carboxylic acids which are liquid at relevant temperatures. As the Federal Circuit has stated, "a patent need not teach, and preferably omits, what is well known in the art" (*Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), *citing Lindemann*

Maschinenfabrik v. American Hoist and Derrick, 730 F.2d 1452, 1463, 221 USPQ 481
489 (Fed. Cir. 1984)).

REJECTION UNDER 35 USC §103(A) OVER VAN OOIJEN

The examiner has rejected the present claims as obvious over the disclosure of van Ooijen (EP 0 608 975 A1, cited by the examiner as GB 0608975 A). Applicants again respectfully traverse this rejection, and submit that van Ooijen teaches away from the present claim elements, thus rebutting the *prima facie* case of obviousness arising from the range overlap (see, e.g., *In re Geisler*, 43 USPQ2d 1362 (Fed. Cir. 1997), see also MPEP §2144.05(III)).

In the present situation, van Ooijen discloses that a hydroxycarboxylate salt may be impregnated with an aliphatic carboxylic acid (p.3:12-14). The amount of carboxylic acid impregnated within the hydroxycarboxylate salt is disclosed to range from 1 to 90% by weight, with preference stated for from 40-60%, and the most preferred embodiment being an equimolar mixture (i.e., 50%). Thus, one of ordinary skill in the art would understand van Ooijen to teach that mixtures of these proportions would best carry out the intentions of that invention. This would lead one of skill in the art to follow that teaching, absent other suggestion or motivation.

In contrast, the present claims are drawn to carboxylic acid salts impregnated with from 0.5 to 30% of a liquid carboxylic acid. As indicated above, such a low amount of impregnating carboxylic acid would be nonpreferred, and at the lowest end of the

range, would be outside of that contemplated at all by van Ooijen. The presently claimed range is a range within the broad disclosure of van Ooijen that is expressly disfavored, and one of skill in the art would not be motivated by that disclosure to pursue such an avenue for making impregnated salts.

Accordingly, as the presumption of *prima facie* obviousness is rebutted by the express teaching of van Ooijen, the present claims are non-obvious over that reference. Applicants respectfully request that the rejection under 35 USC §103(a) based on van Ooijen be withdrawn.

REJECTION UNDER 35 USC §103(A) OVER GONTHIER ET AL.

Gonthier et al. (US 3,600,198) discloses "a mixture of propionic acid and benzoic acid buffered with their corresponding salts of alkali metals or of magnesium," where the overall mixture of the two buffered systems has a pH below 7 "and preferably between 4 and 5" (col.1:53-56). Buffers are aqueous solutions containing a weak acid and its weak conjugate base, and these buffered systems of Gonthier are simply not impregnated salts as presently claimed. That the acid/salt mixtures of Gonthier are in aqueous solution, rather than solid, impregnated salts, is further demonstrated by the recitation of a target pH, as this is a measurement of the hydrogen-ion concentration of a solution.

Accordingly, as Gonthier et al. neither teaches nor suggests the impregnation of a salt with a liquid carboxylic acid, it neither teaches nor suggests all elements of the

present claims. Applicants respectfully request that the examiner withdraw the rejection of the present claims under §103(a) over Gonthier et al.

REJECTION UNDER 35 USC §103(A) OVER KOTANI

Kotani et al. (US 4,122,187) discloses sorbic acid double salts made by combining sorbic acid with sodium or potassium sorbate, or with other organic or inorganic salts (col.2:46-52). A sorbic acid-potassium sorbate double salt is described therein being made from a solution containing equimolar amounts of sorbic acid and potassium sorbate (col.2:52-64). This reference makes no indication that other ratios of carboxylic acid and carboxylic acid salt would be desirable, and thus does not teach, suggest, or give any motivation to make the presently claimed invention. Furthermore, the sorbic acid must be dissolved in ethanol, indicating that this combination is more accurately characterized as an admixture, rather than a liquid acid impregnated within the crystalline structure of a carboxylic acid salt. The fact that the components are dissolved in solution and subsequently cooled to precipitate crystals further supports this different characterization.

Kotani neither teaches nor suggests the present invention. Accordingly, applicants respectfully request that the examiner withdraw the rejection of the present claims under 35 USC §103(a) over Kotani et al.

CONCLUSION

In view of the foregoing amendments and remarks, applicants consider that the rejections of record have been obviated and respectfully solicit passage of the application to issue.

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Respectfully submitted,
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AMENDMENTS TO THE CLAIMS

Please cancel claim 20.

Please amend claims 1, 2, 10, and 12 as follows:

1. (currently amended) Impregnated salts ~~with a particle size of 10µm to 2000µm comprising at least one salt of one or more carboxylic acids, selected from the group consisting of formic acid, acetic acid, propionic acid, amino acids, oxo acids and mineral acids,~~ which salt has been impregnated with from 0.5 to 30% by weight, based on the carboxylic acid salt, of at least one liquid carboxylic acid ~~that is liquid or becomes liquid at a temperature of 40°C or below, also selected from the group consisting of formic acid, acetic acid, propionic acid, amino acids, hydroxy carboxylic acids, oxo acids and mineral acids.~~
2. (currently amended) Impregnated salts as claimed in claim 1, comprising at least one salt of a C₁-C₈-mono- or dicarboxylic acid, ~~carboxylic acid selected from the group consisting of formic acid, acetic acid and propionic acid,~~ which salt has been impregnated with at least one C₁-C₈-mono- or dicarboxylic acid ~~carboxylic acid, also selected from the group consisting of formic acid, acetic acid and propionic acid.~~
10. (currently amended) A preservative as claimed in claim 6, further comprising a protective agent selected from the group consisting of polyethylene glycols,

polyvinylpyrrolidones, or C₃-C₁₄ organic acids and their salts, and amino acids and their salts.

12. (currently amended) A process for producing impregnated salts as claimed in claim 1, which comprises impregnating at least one salt of a carboxylic acid or of a mixture of carboxylic acids ~~selected from the group consisting of formic acid, acetic acid, propionic acid, amino acids, oxo acids and mineral acids~~, with at least one liquid carboxylic acid ~~that is liquid or becomes liquid at a temperature of 40 °C or below and is also selected from the group consisting of formic acid, acetic acid, propionic acid, amino acids, hydroxy carboxylic acids, oxo acids and mineral acids~~, until the concentration is 30% by weight based on the carboxylic acid salt.

Please introduce new claim 22, which reads as follows.

22. (previously original claim 3 - reintroduced) Impregnated salts as claimed in claim 1, comprising at least one salt of a carboxylic acid selected from the group consisting of formic acid, acetic acid or propionic acid, which salt has been impregnated with at least one carboxylic acid selected from the group consisting of formic acid, acetic acid or propionic acid.

AMENDMENTS TO THE SPECIFICATION

Please amend the paragraph beginning on page 2, line 40 of the specification as follows:

The invention additionally relates to the production of preservatives comprising an impregnated salt of the abovementioned composition, which comprises impregnated salts comprising at least one salt of one or more carboxylic acids, which salt has been impregnated with from 0.5 to 30% by weight of at least one liquid carboxylic acid being mixed where appropriate with at least one carrier and/or at least one formulation auxiliary, and being agglomerated with or without addition of one or more binders, and subsequently the preservatives advantageously being provided with a protective agent which solidifies at room temperature (23°_5C), the protective agent being added in an amount such that the resulting preservatives are coated and, where appropriate, further odorization is effected by, for example, adding fragrances. The preservatives produced in this way may advantageously also be coated with a finely dispersed dusting powder to improve the flow properties of the preservatives.

Please amend the paragraph beginning on page 3, line 21 as follows:

Liquid organic acids suitable for impregnating the carboxylic acid salts are acids or mixtures of acids which are liquid or become liquid at the processing temperatures, preferably down to 40°_5C or below.

Please amend the paragraphs found on page 4, line 11 to page 5, line 31 as follows:

The term impregnation means applying at least one carboxylic acid, which is liquid at 40°5C or below, to the solid carboxylic acid salt(s) so that the liquid carboxylic acid(s) penetrate(s) into the salt crystal(s). As a rule, this takes place with slight evolution of heat. For the impregnation, at least one carboxylic acid is applied in an amount of up to 30% by weight, based on the carboxylic acid salt(s), onto the salt(s), preferably applying the carboxylic acid(s) in an amount of from 0.5 to 30% by weight, particularly preferably applying from 15 to 25% by weight, very particularly preferably applying from 15 to 20% by weight, based on the salt component, to produce a solid substance as reaction product. With more than 30% by weight of acid, the salt crystals start to stick together; under these conditions, free carboxylic acid is present to some extent in addition to the impregnated salts. These crystals which are stuck together can be separated from one another by adding a release agent, and the free carboxylic acid can be taken up by the release agent. With more than 35% by weight of acid, the products stick together so strongly that a pasty texture results as a consequence of the free carboxylic acid. These pasty textures can be processed to granules for example in another working step by addition of a release agent and treatment in, for example, a mixer. Since further working steps and larger amounts of a release agent are necessary if more than 30% by weight of free acid is added, these embodiments are less preferred for economic reasons. However, it is possible in principle to improve the flow properties of the

impregnated salts by adding small amounts of a release agent even with less than 30% by weight of carboxylic acid. Examples of suitable and advantageous release agents are Sipernats® (highly disperse silica supplied by Degussa), Aerosils® (silica supplied by Degussa) and/or Tixosils® (silica).

Thus, in the novel process for producing the impregnated salts, at least one salt of a carboxylic acid or of a mixture of carboxylic acids is impregnated with at least one carboxylic acid which is liquid at 40°5C or below until the concentration is 30% by weight based on the carboxylic acid salt(s).

It is also possible in the novel process for producing the impregnated salts to add at least one salt of one or more carboxylic acids to at least one carboxylic acid. This mode of production is less favorable than addition to the salt(s) so that under these conditions, for example when a mixer is used for production, an increased energy input is necessary.

The novel process for producing impregnated salts is advantageously carried out at a temperature determined by the solidification point of the carboxylic acid used. The process is carried out at from 0 to 60°5C, preferably from 15 to 50°5C, particularly preferably from 20 to 40°5C.

In a preferred embodiment, the novel salt also has a protective agent and/or dusting powder on the surface of the crystals. The size of the impregnated salt crystals is preferably below 2.5 mm, particularly preferably from 10 μm to 2000 μm , very particularly preferably from 300 μm to 1500 μm .

The novel preservatives mean preservatives comprising impregnated salts which comprise at least one salt of one or more carboxylic acids and have been impregnated with at least one liquid carboxylic acid. These impregnated salts can be mixed in the preservatives with one or more carriers and/or formulation auxiliaries. It is possible in the novel process for producing the preservatives to agglomerate this mixture with or without addition of binder. It is then possible to apply to these preservatives a protective agent which is soluble or swellable in water at 20°5C and/or a finely dispersed dusting powder so that the novel preservatives have a coating of a protective agent and/or dusting powder.

Please amend the paragraph found on page 6, lines 35-44 as follows:

The impregnated salts and/or carrier particles are mixed with the protective agent, the latter ordinarily consisting of a highly concentrated solution or melt of substances which are soluble or swellable in water and solidify at room temperature (23°5C). This protective agent is preferably applied in the heated state to the impregnated salt and/or carrier particles and mixed with the latter. During this, the protective agent solidifies on

the surface of the impregnated salts and/or carrier particles. Suitable mixer operating parameters result in agglomeration of different particles to larger granules.

Please amend the paragraph found on page 7, lines 26-33 as follows:

Particularly suitable protective agents for the agglomeration process and the coating are those which have a softening temperature above 30°5C, preferably above 60°5C, in order to avoid deformation of the agglomerates if the storage temperature is relatively high. The protective agents which are preferably used additionally do not counteract the pH-lowering effect of the adsorbed organic acid or even, where appropriate, assist or enhance the latter.

Please amend the paragraph found on page 8, lines 12-28 as follows:

Care must be taken to ensure uniform impregnation and to avoid excessive local moistening, which leads to lump formation. After the impregnation, the mixer contains a free-flowing carboxylic acid salt in the form of a crystalline solid. The viscosity of the binder liquid which is subsequently metered in where appropriate should be adjusted, by appropriate selection of the temperature, so that it is below 1000 mPas, preferably < 100 mPas, in order to achieve a fine drop size distribution in the spraying. In this preferred embodiment, owing to the temperature difference between the hot binder liquid and cooler impregnated salt, the drops of binder liquid initially solidify rapidly. As the agglomeration process progresses, the temperature of the bed increases owing to

the mechanical and thermal energy input by from 10 to 30 $^{\circ}$ C, depending on the nature of the binder liquid. Further drops of binder liquid become attached to the previously formed agglomerates, and some of them coalesce together. The energy input increases during the agglomeration.

Please amend the paragraph found on page 9, lines 24-28 as follows:

100 g of sodium formate were introduced into a household mixer (Braun), and 15% by weight of formic acid were added. The temperature rose from 22 $^{\circ}$ C to 40 $^{\circ}$ C on uptake of the acid. The resulting product (= impregnated salt) was free-flowing and odorless.

Please amend the paragraph found on page 9, lines 40-44 as follows:

100 g of potassium formate were introduced into a household mixer, and 10% by weight of formic acid were added. The temperature rose from 23 $^{\circ}$ C to 45 $^{\circ}$ C on uptake of the acid. The impregnated salt had a slightly pungent odor and showed a slight tendency to become granular.

Please amend the paragraphs found on page 10, line 25 to page 11, line 19 as follows:

100 g of calcium propionate were introduced into a household mixer, and 15% by weight of propionic acid were added. The temperature rose from 23 $^{\circ}$ C to

29 $^{\circ}$ 5C on uptake of the acid. The product is free-flowing and has an intense odor.

C. Production of preservatives

Example 8

1000 g of sodium formate were introduced into an Eirich mixer (R02) and impregnated with 15% by weight of formic acid. 200 g of sodium formate melt at 80 $^{\circ}$ 5C are sprayed as binder from a heated storage container through a two-component nozzle onto 1000 g of this mixture into the mixing chamber. The resulting agglomerates are dusted with 44 g of Sipernat[®] (= highly disperse silica supplied by Degussa). The resulting product is free-flowing and odorless.

Example 9

1000 g of sodium formate were introduced into an Eirich mixer and impregnated with 15% by weight of formic acid. For agglomeration and coating, 180 g of a concentrated glucose solution at 80 $^{\circ}$ 5C are sprayed as binder from a heated storage container through a two-component nozzle into the mixing chamber. The resulting agglomerates are dusted with 45 g of Sipernat[®] (= highly disperse silica

supplied by Degussa) and 12 g of citral. The acid content is then 59.5%. The resulting agglomerates are free-flowing.

Example 10

As in Example 9, 500 g of sodium formate were introduced into an Eirich mixer and impregnated with 15% by weight of formic acid. Then 500 g of perlite were added. 260 g of citric acid melt at 170°5C are sprayed in as binder from a heated storage container through a two-component nozzle into the mixing chamber. The resulting agglomerates are dusted with 44 g of Sipernat® (= highly disperse silica supplied by Degussa) and 8 g of vanillin. The total acid content is 29.7%. The resulting preservatives are free-flowing and odorless. The impregnated salts described in Examples 1 to 7 can also be converted as in Examples 8 to 10 into free-flowing preservatives with a reduced odor or no odor.

COPY OF ALL CLAIMS

1. (currently amended) Impregnated salts comprising at least one salt of one or more carboxylic acids, which salt has been impregnated with from 0.5 to 30% by weight, based on the carboxylic acid salt, of at least one liquid carboxylic acid.
2. (currently amended) Impregnated salts as claimed in claim 1, comprising at least one salt of a C₁-C₈-mono- or dicarboxylic acid, which salt has been impregnated with at least one C₁-C₈-mono- or dicarboxylic acid.
3. (canceled)
4. (previously amended) Impregnated salts as claimed in claim 1, where the carboxylic acids in the carboxylic acid salts and the carboxylic acid used for impregnating the salts are identical.
5. (previously amended) Impregnated salts as claimed in claim 1, wherein the impregnated salts comprise at least one salt selected from the group of ammonium, potassium, sodium, lithium, magnesium or calcium salts.
6. (original) A preservative comprising an impregnated salt as claimed in claim 1.

7. (previously amended) A preservative as claimed in claim 6, additionally comprising a carrier.
8. (previously amended) A preservative as claimed in claim 6, which is coated with a protective agent which is soluble or swellable in water at 20°C.
9. (previously amended) A preservative as claimed in claim 6, wherein water-soluble polymers, organic acids, their salts or low-melting inorganic salts are used as protective agents.
10. (currently amended) A preservative as claimed in claim 6, further comprising a protective agent selected from the group consisting of polyethylene glycols, polyvinylpyrrolidones, C₃-C₁₄ organic acids and their salts, and amino acids and their salts.
11. (previously amended) A preservative as claimed in claim 6, wherein a dusting powder is applied to the surface in addition to or in place of the protective agent.
12. (currently amended) A process for producing impregnated salts as claimed in claim 1, which comprises impregnating at least one salt of a carboxylic acid or of a mixture of carboxylic acids, with at least one liquid carboxylic acid until the

concentration is 30% by weight based on the carboxylic acid salt.

13. (original) A process as claimed in claim 12, wherein at least one carboxylic acid is introduced into a mixer, and at least one salt of a carboxylic acid or of a mixture of carboxylic acids is metered in.
14. (previously amended) A process for producing a preservative, which comprises mixing impregnated salts as claimed in claim 1 with one or more carriers and/or formulation auxiliaries, and agglomerating with or without the addition of at least one binder.
15. (original) A process as claimed in claim 14, wherein the preservative is coated with a protective agent which is soluble or swellable in water at 20°C and/or if required the flow characteristics of the preservative are ensured by dusting with a finely dispersed dusting powder.
16. (previously amended) A process for preserving human and animal food, wherein the impregnated salts as claimed in claim 1, or the preservatives are added to the human or animal food.
17. (previously added) A preservative as claimed in claim 6, additionally comprising

formulation auxiliaries.

18. (previously added) A preservative as claimed in claim 10, wherein the protective agent is selected from the group consisting of C₃-C₆ organic acids and their salts.
19. (previously added) A preservative as claimed in claim 18, wherein the protective agent is selected from the group consisting of citric acid, fumaric acid, succinic acid, adipic acid, benzoic acid and their salts.
20. (canceled)
21. (previously added) A process for acid treatment wherein the impregnated salts of claim 1 or the preservatives are introduced into or placed on an item to be treated.
22. (reinstated - formerly claim 3) Impregnated salts as claimed in claim 1, comprising at least one salt of a carboxylic acid selected from the group consisting of formic acid, acetic acid or propionic acid, which salt has been impregnated with at least one carboxylic acid selected from the group consisting of formic acid, acetic acid or propionic acid.